

CLAIMS

What is claimed is:

1. A computer network, the computer network including a plurality of managed sites, wherein each of the managed sites comprises:

5 a. at least one manager engine computer coupled to a plurality of managed nodes, the at least one manager engine computer including a management software component, the management software component being capable of retrieving and storing data representative of network system state information, the network system state information comprising relationships among a plurality of managed network elements,
10 wherein at least one of the plurality of managed network elements corresponds to one of the plurality of managed nodes; and

b. at least one client computer coupled to the at least one manager engine computer, the at least one client computer including a data retrieval software component, the data retrieval software component being capable of retrieving the data
15 representative of network system state information from the at least one manager engine computer and of presenting the data representative of network system state information to a user.

2. The computer network of claim 1 wherein the data representative of network system state information is stored in a database on the at least one manager engine
20 computer, the data base comprising data representing information about the plurality of managed network elements, the information about the plurality of network elements including, for each element of the plurality of managed network elements, an element

type, possible parents of the element, a corresponding assigned manager engine computer for the element, a corresponding command list, if any, for the element, any security restrictions for the managed element and information relating the element to others of the plurality of managed network elements.

5 3. The computer network of claim 1 wherein the data retrieval software component includes a snap-in application.

4. The computer network of claim 1 wherein the relationships among the plurality of managed network elements include one-way relationships.

5. The computer network of claim 1 wherein the relationships among the plurality of
10 managed network elements include two way relationships.

6. The computer network of claim 1 wherein the data retrieval software component includes a user interface software component, the user interface software component presenting the data representative of network state information to the user by representing each of the plurality of managed network elements with a corresponding icon and by
15 representing the relationships among the plurality of managed network elements with corresponding connectors visibly connecting icons.

7. A manager engine computer coupled to a plurality of managed nodes located in one of a plurality of managed sites comprising a network, the manager engine computer communicating with the plurality of managed nodes and storing data representative of
20 network state information in a relational database, the network state information being organized as a series of relationships among managed elements of the network, the data representative of network state information comprising:

a. a managed element table, the managed element table comprising data about managed elements of the network;

b. a managed element relationship table, the managed element relationship table comprising data about possible relationships among the managed elements of the network; and

c. a managed element type table, the managed element type table comprising data representative of type information for the managed elements of the network.

8. The manager engine computer of claim 7 wherein the relational database further comprises stored data representative of network characteristic information, the data representative of network characteristic information including a message class table, the message class table comprising data representative of the class of messages used in connection with the manager engine computer communicating with the plurality of manage nodes.

9. The manager engine computer of claim 8 wherein the data representative of network characteristic information further comprises a security role table, the security role table comprising data representative of levels of security access for users of the network.

10. A computer readable storage medium having stored thereon data representative of network state information, the network state information being organized as a series of tables in a relational database, the relational database comprising:

a. a managed element table, the managed element table comprising data about managed elements of the network;

b. a managed element relationship table, the managed element relationship table comprising data about possible relationships among the managed elements of the
5 network; and

c. a managed element type table, the managed element type table comprising data representative of type information for the managed elements of the network.

11. The computer readable storage medium of claim 10 wherein the relational database further comprises a message class table, the message class table comprising data
10 representative of a class of messages used in connection with a manager engine computer communicating with a plurality of manage nodes in a managed site of the network.

12. The computer readable storage medium of claim 11 wherein the relational database further comprises a security role table, the security role table comprising data
15 representative of levels of security access for users of the network.

13. A method for maintaining a site master designation for one of a plurality of manager engine computers coupled to one another in one of a plurality of managed sites comprising a network, said plurality of manager engine computers each maintaining state information about a corresponding connected group of managed node computers, the
20 method comprising performing the following steps at each of the plurality manager engine computers that are operational:

a. checking continuously whether one of the plurality of manager engine computers has entered an off line state;

b. in the event that one of the plurality of manager engine computers has entered an off line state, determining whether the one of the plurality of manager engine computers is assigned a site manager designation and, if so:

- i. generating a first random number identifier;
- ii. comparing the first random number identifier to other random number identifiers generated by other of the plurality of manager engine computers; and
- iii. self assigning a site master designation in the event the first random number identifier is greater than the other random number identifiers.

14. A method for maintaining a site master designation for one of a plurality of manager engine computers coupled to one another in one of a plurality of managed sites comprising a network, said plurality of manager engine computers each maintaining state information about a corresponding connected group of managed node computers, the method comprising performing the following steps at each of the plurality manager engine computers that are operational:

a. checking continuously whether one of the plurality of manager engine computers has entered an off line state;

b. in the event that one of the plurality of manager engine computers has entered an off line state, determining whether the one of the plurality of manager engine computers is assigned a site manager designation and, if so:

- i. generating a first random number identifier;
- ii. comparing the first random number identifier to other random number identifiers generated by other of the plurality of manager engine computers; and
- iii. self assigning a site master designation in the event the first
5 random number identifier is less than the other random number identifiers.

15. A method for initiating and maintaining a site master designation for one of a plurality of manager engine computers coupled to one another in one of a plurality of managed sites comprising a network, said plurality of manager engine computers each maintaining state information about a corresponding connected group of managed node
10 computers, the method comprising:
- a. assigning a first one of the plurality of manager engine computers a site master designation;
 - b. determining at a second one of the plurality of manager engine computers whether the first one of the plurality of manager engine computers has entered an off line
15 state, and, if so, performing the following at the second one of the plurality of manager engine computers:

- i. generating a first random number identifier;
- ii. comparing the first random number identifier to other random number identifiers generated by ones of the plurality of manager engine computers other
20 than the second one of the plurality of manager engine computers; and
- iii. self assigning a site master designation in the event the first random number identifier is greater than the other random number identifiers.

16. A method for initiating and maintaining a site master designation for one of a plurality of manager engine computers coupled to one another in one of a plurality of managed sites comprising a network, said plurality of manager engine computers each
5 maintaining state information about a corresponding connected group of managed node computers, the method comprising:
- a. assigning a first one of the plurality of manager engine computers a site master designation;
 - b. determining at a second one of the plurality of manager engine computers
10 whether the first one of the plurality of manager engine computers has entered an off line state, and, if so, performing the following at the second one of the plurality of manager engine computers:
 - i. generating a first random number identifier;
 - ii. comparing the first random number identifier to other random
15 number identifiers generated by ones of the plurality of manager engine computers other than the second one of the plurality of manager engine computers; and
 - iii. self assigning a site master designation in the event the first random number identifier is less than the other random number identifiers.
17. A method for initiating and maintaining a site master designation for one of a
20 plurality of manager engine computers coupled to one another in one of a plurality of managed sites comprising a network, said plurality of manager engine computers each

maintaining state information about a corresponding connected group of managed node computers, the method comprising:

a. assigning a first one of the plurality of manager engine computers a site master designation; and

5 b. determining whether the first one of the plurality of manager engine computers has entered an off line state, and, if so, randomly assigning a site master designation to a second one of the plurality of manager engine computers.

18. A computer network, the computer network including a plurality of managed sites, wherein each of the managed sites comprises:

10 a. at least one manager engine computer coupled to a plurality of managed nodes, the at least one manager engine computer including

 i. a management software component, the management software component being capable of retrieving and storing data representative of network system state information, the network system state information comprising
15 relationships among a plurality of managed network elements, wherein at least one of the plurality of managed network elements corresponds to one of the plurality of managed nodes; and

 ii. an audit software component, the audit software component being capable of storing in a log file data representative of audit information about
20 applications running on the plurality of managed nodes; and

b. at least one client computer coupled to the at least one manager engine computer, the at least one client computer including a data retrieval software component, the data retrieval software component being capable of retrieving the data representative of network system state information and audit information from the at least one manager engine computer and of presenting the data representative of network system state information and audit information to a user.

19. The computer network of claim 18 wherein the audit software component further includes an audit information producer component and an audit information consumer component, the audit information producer component retrieving stored data in the log file and placing it in a shared buffer comprised of two queues, the audit information consumer component retrieving data from the shared buffer in response to requests communicated from the data retrieval software component on the at least one client computer, wherein the audit information consumer component operates in a manner that is asynchronous relative to operation of the audit information producer component.

20. The computer network of claim 19 wherein operation of the audit information consumer component comprises continuously alternating among retrieving data from a first of the two queues while the audit information producer component places log file data in the a second of the two queues and retrieving data from the second of the two queues while the audit information producer component places log file data in the first of the two queues.

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